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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/817,094
Filing Date: April 02, 2004
Appellant(s): GAIKWAD ET AL.

Joseph M. Butscher
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 05/24/2010 appealing from the Office action mailed 11/13/2009.

(1) Read Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The examiner has no comment on the appellant's statement of the status of claims contained in the brief.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

6272322	Su	8-2001
7212798	Adams et al.	5-2007
6704352	Johnson	3-2004
6603810	Bednekoff et al.	8-2003
5999803	Kim	12-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-5, 10, 12, 14-19, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su (US Patent#6272322) in view of Adams et al. (US Patent#7212798). Regarding claim 1, Su teaches a method of operating a radio frequency communication system having a receiver portion circuitry, the method comprising:

arranging the transmitter portion in a first transmitter configuration (P1 on) and the receiver portion in a first receiver configuration (Q1 off, Fig. 3, column 7 lines 45-59);

take a first signal power measurement(column 7 lines 45-59);

configuring the transmitter portion in a second transmitter configuration (P1 off) and the receiver portion in a second receiver configuration (Q1 on), wherein the first transmitter configuration is different than the second transmitter configuration and the first receiver configuration is different than the second receiver configuration (column 7 lines 60-65);

performing a second signal power measurement (column 7 lines 60-65); and

adjusting the operation of the receiver portion based upon the first signal power measurement and the second signal power measurement (column 7 line 66 to column 8 line 17,

where determined attenuators are used in calibrate/adjust operation of receiver; column 2 lines 24-49, column 9 lines 58-65, where measurement results during calibration eventually lead to adjusting receiver operation).

But, Su does not expressly disclose wherein the adjusting comprises modifying at least one threshold related to processing of receive signal strength indicator data used in the operation of the radio frequency communication system.

Adams et al. teach a RF communication system calibrates transmitter and/or receiver based on measurements of receive signal strength indicator (Fig. 6, column 4 line 46 to column 5 line 48, column 8 lines48-61, column 11 lines 8-13), wherein RSSI setpoint is adjusted based on measurements (column 11 line 60 to column 13 line 67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate adjusting RSSI setpoint with received signal strength measurements taught by Adams et al. into the method of Su, in order to correct desired signal strength level.

Regarding claim 15, Su and Black et al. teach a radio frequency communication system as explained in response to claim 1 above, wherein Su teaches

transmitter circuitry (603 of Fig. 6) for generating a radio frequency signal, the output of the transmitter circuitry coupled to at least one antenna (Antenna of Fig. 6);

switching circuitry (102 of Fig. 6) having an input coupled to the at least one antenna, an output, and at least a first mode and a second mode of operation (receiving mode and transmitting mode), the first mode of switching circuitry passing a signal from the input to the output with relatively lower level of attenuation, and the second mode of the switching circuitry

passing a signal from the input to the output with a relatively higher level of attenuation (Fig. 3, column 7 lines 60-65, wherein attenuator P1 or Q1 obviously considered as part of switching mode, and attenuator on/off mode produces high/low attenuation in calibration);

receiver circuitry (602 of Fig. 6) for accepting a radio frequency signal from the output of the switching circuitry, the receiver circuitry producing at least a receive signal power measurement (column 7 lines 60-65); and

the radio frequency communication system adjusting at least one characteristic of the receive signal power based on two signal power measurements using the switching circuitry and the transmitter circuitry (column 7 lines 46-65, wherein loopback calibration uses switch and transmitter; column 7 line 66 to column 8 line 17, wherein calibration changes receive signal power).

But, Su does not expressly disclose using receive signal strength indicator for signal power measurement.

Adams et al. teach a RF communication system calibrates transmitter and/or receiver based on measurements of receive signal strength indicator (Fig. 6, column 4 line 46 to column 5 line 48, column 8 lines48-61, column 11 lines 8-13), wherein RSSI setpoints are adjusted based on measurements (column 11 line 60 to column 13 line 67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate using receive signal strength indicator taught by Adams et al. into the radio frequency communication system of Su for power measurement parameter.

Regarding claim 23, Su and Adams et al. teach a radio frequency communication system as explained in response to claim 15 above.

Regarding claims 2 and 16, Su and Adams et al. teach the limitations of claims 1 and 15. Su teaches the arranging, taking, configuring, performing, and adjusting occur on a periodic basis (column 4 lines 16-19), which makes the method of Su and Adams et al. also occur on a periodic basis because different calibration results require different adjustments.

Regarding claims 3 and 17, Su and Adams et al. teach the limitations of claims 1 and 15. Su teaches the radio frequency communication system communicates digital information (Fig. 6).

Regarding claims 4 and 18, Su and Adams et al. teach the limitations of claims 1 and 15. Adams et al. teach the receiver portion and the transmitter portion are located within the same integrated circuit (Fig. 4, column 7 lines 31-33).

Regarding claims 5 and 19, Su and Adams et al. teach the limitations of claims 1 and 15. Adams et al. teach wherein the at least one characteristic comprises at least one of a slope and a fixed offset of the receive signal strength indicator (column 13 lines 53-67, setpoint errors of RSSI level).

Regarding claim 10, Su and Adams et al. teach the limitation of claim 1.

Su teaches wherein the arranging provides a relatively lower level of radio frequency signal to the receiver portion (Fig. 3, having attenuation with P1 or Q1 on).

Regarding claim 12, Su and Adams et al. teach the limitation of claim 1.

Su teach wherein the configuring provides a relatively higher level of radio frequency signal to the receiver portion (Fig 3, no attenuation with P1 or Q1 off).

Regarding claim 14, Su and Adams et al. teach the limitation of claim 1.

Su and Adams et al. teach further comprising: adjusting the operation of the transmitter portion based upon the first signal power measurement and the second signal power measurement (column 7 line 66 to column 8 line 17, where determined attenuators are used in calibrate/adjust operation of transmitter)

Regarding claim 22, Su and Adams et al. teach the limitation of claim 15.

Adams et al. teach wherein the adjusting comprises modifying at least one threshold related to receive signal strength indicator data used in the operation of the radio frequency communication system (column 11 line 60 to column 12 line 11, column 13 lines 53-67, adjust RSSI setpoints).

2. Claims 6-7 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su (US Patent#6272322) in view of Adams et al. (US Patent#7212798) and Bednekoff et al. (US Patent#6603810).

Regarding claims 6 and 20, Su and Adams et al. teach the limitations of claims 1 and 15.

But, Su and Adams et al. do not expressly disclose the adjusting further comprises modifying the value of a receive signal strength indicator using an affine function.

However, Adams et al. teach using a look-up table to correct non-linearities in RSSI measurements (column 12 lines 12-14), which is considered as an affine function implemented in a look-up table.

Bednekoff et al. teach a receiver calibrating method that adjusts RSSI value using RSSI correction factors according a look-up table, where affine or coordinated relationships are involved therein (column 7 lines 9-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate using adjusting RSSI value with affine function taught by Bednekoff et al. into the method of Su and Adams et al., in order to provide coordinated RSSI adjustment to the receiver.

Regarding claims 7 and 21, Su, Adams et al., and Bednekoff et al. teach the limitations of claims 6 and 20.

Su, Adams et al., and Bednekoff et al. teach wherein the affine function is implemented using a look-up table (column 7 lines 9-60 of Bednekoff et al.).

3. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Su (US Patent#6272322) in view of Adams et al. (US Patent#7212798) and Johnson (US Patent#6704352).

Regarding claim 9, Su and Adams et al. teach the limitation of claim 1.

Su and Adams et al. teach wherein the adjusting comprises modifiying at least one of a receive signal strength indicator slope and a receive signal strength indicator fixed offset, but Su and Adams et al. do not expressly disclose being in an analog receive signal strength indicator circuit.

Johnson teaches a receiver calibrating method that comprises calibrating at least one of the slope and the fixed offset of a receive signal strength indicator (column 1 lines 37-62, column 3 line 23 to column 4 line 27, column 10 lines 12-41).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate details of calibrating receiver gain taught by Johnson into the method and system of Su and Adams et al., in order to provide appropriate adjustment to RSSI over time.

4. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su (US Patent#6272322) in view of Adams et al. (US Patent#7212798) and Kim (US Patent#5999803)

Regarding claim 11, Su and Adams et al. teach the limitation of claim 10.

But, Su and Adams et al. do not expressly disclose wherein the relatively lower level of radio frequency signal corresponds to a signal power of less than approximately -90 dBm.

Kim teaches wherein the relatively lower level of radio frequency signal corresponds to a signal power of less than approximately -90 dBm (column 2 lines 27-64).
Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate having the relatively lower level of radio frequency signal corresponds to a signal power of less than approximately -90 dBm taught by Kim into the method of Su and Adams et al. for ranging RSSI detection by design preference.

Regarding claim 13, Su and Adams et al. teach the limitation of claim 12.
But, Su and Adams et al. do not expressly disclose wherein the relatively higher level of radio frequency signal corresponds to a signal power of greater than approximately -30dBm.

Kim teaches wherein the relatively higher level of radio frequency signal corresponds to a signal power of greather than approximately -30 dBm (column 2 lines 27-64).
Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate having the relatively higher level of radio frequency signal corresponds to a signal power of greather than approximately -30 dBm taught by Kim into the method of Su and Adams et al. for ranging RSSI detection by design preference.

(10) Response to Argument

Appellant's arguments with respect to Su (US6272322) and Adams et al. (US7212798) on claims 1-5, 10, 12, 14-19 and 22-23 have been fully considered but they are not persuasive.

(Claim 1) The appellant argued that Su does not teach "adjusting the operation of the receiver portion based upon the first signal power measurement and the second signal power measurement" because there is nothing in Su that teaches operation of a receiver based on multiple power measurements.

In response to the argument, the examiner respectfully disagrees with the appellant's argument. Su clearly discloses a calibration scheme for adjusting receiver gain (column 2 lines 35-48), wherein multiple power measurements are conducted. In Fig. 3, both transceiver 301 and transceiver 302 respectively have unknown transmitter attenuators P1, P2 and unknown receiver attenuators Q1, Q2. Hence, multiple power measurements are performed to determine the unknown attenuators for both transceivers 301 and 302. For clarification, the following explanation is about transceiver 301.

In 401 of Fig. 4, Su teaches a loopback test for transceiver 301 with attenuators P1 and Q1 deactivated. A signal power measurement is conducted to determine transmit gain T1 and receive gain R1 (column 5 lines 33-65). In 404 of Fig. 4, Su teaches calibrating attenuators P1 and Q1 for transceiver 301. With all the known elements (e.g. transmit power, receive power, transmit gain, and receive gain), transmitter attenuator P1 is determined by a signal power measurement with P1 activated and Q1 deactivated (column 7 lines 46-59). Receiver attenuator Q1 is determined by another signal power measurement with P1 deactivated and Q1 activated (column 7 lines 60-63). Hence, one of ordinary skill in the art would have understood that in Su there are multiple signal power measurements conducted with different transmitter and receiver configurations (e.g., both P1 and Q1 deactivated, P1 activated and Q1 deactivated, P1 deactivated and Q1 activated). With all the transceiver values (e.g. T1, R1, P1, & Q1) calibrated,

Su further teaches "... control the gains of both the receive and transmit paths as well as the transmitter power level based on the results of the calibration described above" (column 9 lines 62-65, control/adjust gains of receiver portion based on calibration results). Thus, Su does teach the argued limitation "adjusting the operation of the receiver portion based upon the first signal power measurement and the second signal power measurement".

(Claim 1 cont.) The appellant then argued Adams fails to teach "wherein the adjusting comprises modifying at least one threshold related to processing of receive signal strength indicator data used in the operation of the radio frequency communication system", because "setpoint" in Adams is not the same as "threshold" and Adams merely discloses comparing the "respective received signal strength measurement" to its respective setpoint but not modifying.

In response to the argument, the examiner respectfully disagrees with the appellant's argument. Adams teaches a method of adjusting gains in a receiver (abstract, Fig. 7, column 7 lines 9-57), which would have been obvious to one of ordinary skill in the art to recognize its art correspondence to Su's post-calibration adjustment on receiver. Despite appellant's argument on differentiating "setpoint" from "threshold", appellant neither defines the term "threshold" nor specifically limits operation and/or objective of "threshold" modification in claims. Based on filed specification (paragraph 0039 of published application), "threshold" is a value used as a decision point or factor for RSSI comparison in the management of the RF communication device. So, giving the broadest and reasonable interpretation on appellant's claim language, the claimed "threshold" is interpreted as "setpoint" of Adams because setpoint is too used as a decision point for RSSI comparison (Fig. 6, column 10 lines 45-54, column 11 lines 47-54, a desired RSSi level is a setpoint). Besides comparing, Adams does teach adjusting/modifying

setpoints to account for the amount of filtering between the measurement points, e.g., as a measure of amount of adjacent channel interference (Fig. 7, column 11 line 60 to column 12 line 11, column 12 line 65 to column 13 line 3).

Thus, Su and Adams et al. teach the limitation of the claim.

(Claims 15 and 23) The appellant argued that Su does not teach adjusting receive signal power based on multiple signal power measurements.

In response to the argument, the examiner respectfully disagrees with the appellant's argument. Applying the explanation to claim 1 rejection above, Su does teach the argued adjusting receive signal power based on multiple signal power measurements.

Thus, Su and Adams et al. teach the limitations of the claims.

(Claims 2 and 16) The appellant argued that Su does not teach "wherein the arranging, taking, configuring, performing, and adjusting occur on a periodic basis" because there are no claimed "arranging, taking, configuring, performing, and adjusting" in cited reference.

In response to the argument, the examiner respectfully disagrees with the appellant's argument. The "arranging, taking, configuring, performing, and adjusting" in claim are steps of claim 1. Applying the explanation to claim 1 rejection above, Su and Adams teach a calibration method that comprises the steps of "arranging, taking, configuring, performing, and adjusting". In column 4 lines 9-16, Su discloses "A method and apparatus for determining transmit and receive gain of a wireless transceiver as well as the path loss between multiple (e.g., two or more) transceivers…" which corresponds to the calibration method of Su (Figs. 4-5). In column

4 lines 16-19, Su further discloses "In one embodiment, the real-time gain and path loss calibration scheme can determine the gain and path loss of a wireless system during network establishment and at periodic intervals during regular operation". Since different results from periodic calibrations require different adjustments, it would have been obvious to one of ordinary skill in the art to recognize that calibration method of Su and Adams et al. is performed periodically during regular operation.

Thus, Su and Adams et al. teach the limitations of the claims.

(Claims 5 and 19) The appellant again argued that a setpoint is not a threshold. The appellant then argued that neither Su nor Adams et al. teach "wherein the adjusting comprises calibrating at least one of a slope and a fixed offset of a receive signal strength indicator".

In response to the argument, the examiner respectfully disagrees with the appellant's argument. Applying the explanation to claim 1 rejection above, setpoint of Adams et al. teaches argued "threshold" in claims. First off, Adams et al. teach that a setpoint is a desired level of RSSI (receive signal strength indicator) (column 11 lines 50-54). Second, although appellant uses the term "fixed" to describe "offset" in claims, the "offset" is only fixed on periodic basis. Otherwise, there is no need for adjusting or calibrating. And, the steps of claim 1 do not occur on a periodic basis. Adams et al. teach computing respective setpoint errors as the corrected/averaged (periodic basis) RSSI measure minus its setpoint (column 13 lines 53-56), which is a fixed offset of a RSSI for a period of calibration. Third, corresponding to teachings of Su and Adams et al. in adjusting gains in receiver portion, Adams et al. discloses "Each of the gain adjust logic circuits 729, 739, and 749 respectively determine a "request gain" as the

"existing gain," produced by the current gain control bits, minus the setpoint error from the respective compare-to-setpoint logic circuits" (column 13 lines 56-60). So, Adams et al. do teach adjusting the operation of the receiver portion comprises "calibrating ***at least*** one of a slope and ***a fixed offset of a receive signal strength indicator***".

Thus, Su and Adams et al. teach the limitations of the claims.

(Claim 22) The appellant argued that Adams et al. do not teach "wherein the adjusting comprises modifying at least one threshold related to receive signal strength indicator data used in the operation of the radio frequency communication system".

In response to the argument, the examiner respectfully disagrees with the appellant's argument. Applying the explanation to claim 1 rejection above, setpoint of Adams et al. teaches argued "threshold" in claim. As explained above, Adams et al. teach not only comparing but also adjusting/modifying setpoint, aka. threshold.

Thus, Su and Adams et al. teach the limitation of the claim.

Appellant's arguments with respect to Su (US6272322), Adams et al. (US7212798), and Bednekoff et al. (US6603810) on claims 6-7 and 20-21 have been fully considered but they are not persuasive.

(Claims 6 and 20) The appellant argued that none of the references teaches "wherein the adjusting comprises modifying the value of a receive signal strength indicator using an affine function", because Bednekoff et al. does not mention the word "affine".

In response to the argument, the examiner respectfully disagrees with the appellant's argument. First off, appellant's claims do not specify what "an affine function" is. The filed specification discloses implementing "affine function" using a look-up table (paragraphs 0007, 0010 of published application) and "an affine relation" of the actual/observed RSSI to expected/ideal RSSI in equation (paragraphs 0030, 0032 of published application), which are none limited in claims. So, giving the broadest and reasonable interpretation on appellant's claim language, the claimed "affine function" is interpreted as a coordination transformation relationship. Second, Adams et al. teach using a lookup table to make correction for any non-linearities in signal strength measurements (column 12 lines 12-14), wherein the look-up table obviously is a linear coordination transformation relationship implemented in a look-up table. And, Bednekoff et al. further teaches adjusting RSSI according a look-up table with different attenuation factors (column 7 lines 9-31), which is also another coordination transformation relationship implemented in another look-up table. Thus, both Adams et al. and Bednekoff et al. do teach "modifying the value of a receive signal strength indicator using an affine function".

Thus, Su, Adams et al., and Bednekoff et al. teach the limitations of the claims.

Appellant's arguments with respect to Su (US6272322), Adams et al. (US7212798), and Johnson (US6704352) on claim 9 have been fully considered but they are not persuasive.

(Claim 9) The appellant argued that none of the references teaches "wherein adjusting comprises modifying at least one of a receive signal strength indicator slope and a receive signal strength indicator fixed offset".

In response to the argument, the examiner respectfully disagrees with the appellant's argument. Applying the explanation to claims 5 and 19 rejections above, Adams et al. do teach the argued limitation.

Thus, Su, Adams et al., and Johnson teach the limitations of the claims.

Appellant's arguments with respect to Su (US6272322), Adams et al. (US7212798), and Kim (US5999803) on claims 11 and 13 have been fully considered but they are not persuasive.

(Claim 13) The appellant argued that Kim teaches that "level of the received signal can be detected only when an RF signal of a level corresponding to a -30dBm through -110dBm range is supplied to the IF processor" (column 2 lines 30-33). Thus, at the signal level, "greater than approximately -30dBm", as recited in claim 13, Kim teaches that signal cannot be detected.

In response to the argument, the examiner respectfully disagrees with the appellant's argument. First off, filed specification discloses "the RSSI circuit 240 may, for example, operate over a received signal power range of -90dBm to -30dBm" (paragraph 0028 of published application), which corresponds to "The relatively lower level of radio frequency signal may correspond to a signal power of less than approximately -90dBm. The configuring may provide a relatively higher level of radio frequency signal to the receiver portion, and the relatively higher level of radio frequency signal may correspond to a signal power of greater than approximately -30dBm" (paragraph 0008 of published application). So, Kim's teaching in a signal detection range of -110dBm to -30dBm teaches the argued limitation. Second, if appellant is relating "a signal power of greater than approximately -30dBm" to be a number towards

positive (+), e.g. -25dBm, Kim's teaching still applies. In the argued limitation, applicants use an indefinite term of "approximately". One of ordinary skill in the art would have taken -33dBm to be "approximately -30dBm". Then, -31dBm or -32dBm within the signal detection range of Kim still teaches "a signal power of greater than approximately -30dBm".

Thus, Su, Adams et al., and Kim teach the limitation of the claim.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Art Unit 2618

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